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**LAMINAR INORGANIC SUBSTANCE-CONTAINING RESIN FILM**

Patent Number: JP11071509

Publication date: 1999-03-16

Inventor(s): SUZUKI NORIYUKI

Applicant(s): KANEKA FUCHI CHEM IND CO LTD

Requested Patent: JP11071509

Application Number: JP19980182189 19980629

Priority Number(s):

IPC Classification: C08L67/02; C08J5/18; C08K3/34; C08K5/54; C08K9/06; C08L69/00

EC Classification:

Equivalents:

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**Abstract**

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**PROBLEM TO BE SOLVED:** To prepare the subject film capable of maintaining transparency and surface smoothness of a resin of its own, developing excellent modulus of elasticity, dimensional stability, gas barrier properties, etc., useful in the field of food packaging material, liquid crystal board, etc., by adding a prescribed silane clay composite to a specific resin.

**SOLUTION:** This film comprises (A) a polyester resin or a polycarbonate resin and (B) a silane clay composite material. The component B is prepared by introducing a compound (B2) of the formula  $Y_n Si_4-n$  [ $Y$  is a (substituted) 1-25C hydrocarbon group; X is a hydrolyzable group or OH; (n) is 0-3] to a swelling silicate (B1) such as smectite group clay or swelling mica. The average layer thickness of the component B in the film is adjusted to  $\leq 300 \text{ \AA}$  (preferably the average aspect ratio is 10-300 and the number of particles existing in  $100 \mu \text{m}^2$  film area per unit ratio is  $\geq 30$ ).

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## COMPOUNDED CLAY AND CLAY COMPOSITE MATERIAL AND PRODUCTION THEREOF

Patent Number: JP9227778

Publication date: 1997-09-02

Inventor(s): USUKI ARIMITSU;; OKADA AKANE

Applicant(s): TOYOTA CENTRAL RES & DEV LAB INC

Requested Patent:  JP9227778

Application Number: JP19960061924 19960222

Priority Number(s):

IPC Classification: C08L83/04; C08K3/34; C08K9/04; C08L71/02

EC Classification:

Equivalents:

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### Abstract

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**PROBLEM TO BE SOLVED:** To produce a compound clay and a clay composite material capable of uniformly dispersing a clay mineral in a polymer at a molecular level and provide a method for producing both.

**SOLUTION:** This compounded clay comprises a layer clay mineral 7 dispersed in an infinitely swollen state as a layer unit in matrix molecules 1 having nonpolar side chains 10. The matrix molecules 1 are composed of a polysiloxane or a polyoxyalkylene. Organic onium ions 6 and the matrix molecules 1 are interposed between layers of the layer clay mineral 7. The layer clay mineral 7 is bonded to the organic onium ions 6 through ionic bonding and further to the matrix molecules 1 through hydrogen bonding. The molecular length of the nonpolar side chains 10 in the matrix molecules 1 is same as or larger than that of an organic main chain part of the organic onium ions 6.

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## MANUFACTURE OF COMPOSITE MATERIAL OF THERMOPLASTIC RESIN-CLAY MINERAL

Patent Number: JP9225991

Publication date: 1997-09-02

Inventor(s): OKANO HIROSHI;; OYAMADA HIROSHI

Applicant(s): ASAHI CHEM IND CO LTD

Requested Patent:  JP9225991

Application Number: JP19960039297 19960227

Priority Number(s):

IPC Classification: B29C47/60; B29B7/46; C08J3/20; C08K3/00; C08L77/00; C08L101/00

EC Classification:

Equivalents:

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### Abstract

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**PROBLEM TO BE SOLVED:** To manufacture a composite material of thermoplastic resin-clay mineral with good mechanical properties by an economical and simple method.

**SOLUTION:** The manufacture is such that (A) 100 pts.wt. of thermoplastic resin, (B) 0.05-50 pts.wt. of clay mineral with an onium ion carrying organic substance inserted in layers, and (C) dispersion medium of 0.1-5000 pts.wt. of dispersion medium relative to 100 pts.wt. of (B) component are melt-kneaded by an extruder having a ratio of flight width/pitch in the screw of a supplier in the range of 0.1-0.49.

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## POLYVINYL ALCOHOL-BASED COMPOSITION AND ITS PRODUCTION

Patent Number: JP9202843

Publication date: 1997-08-05

Inventor(s): USAMI JINICHI;; YOSHINAGA MASANOBU

Applicant(s): TOPPAN PRINTING CO LTD

Requested Patent:  JP9202843

Application Number: JP19960010871 19960125

Priority Number (s):

IPC Classification: C08L29/04; C08L29/04; B32B27/20; B32B27/30; B65D81/24; C08F8/00; C08F8/42; C08F216/06; C08K3/36; C09D129/04

EC Classification:

Equivalents:

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### Abstract

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**PROBLEM TO BE SOLVED:** To obtain the subject composition excellent in resistance to water and moisture, and capable of preserving high gas barrier property inherent in polyvinyl alcohol-based resin even if exposed to a highly humid atmosphere.

**SOLUTION:** This composition is such a one that an inorganic lamellar compound such as montmorillonite is located at voids in a crosslinked polymer consisting of a modified polyvinyl alcohol-based resin. The inorganic lamellar compound particles can be surely located at the voids of the crosslinked polymer by dissolving the crosslinked polymer in a solvent followed by adding the inorganic lamellar compound in the resultant solution.

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## SOL-GEL COMPOSITION

Patent Number: JP9175817  
Publication date: 1997-07-08  
Inventor(s): SEKIMOTO TAKAHIRO;; SAITO KANAKO;; FUJISAKI TOSHIKAZU;; ANDO SEINOSUKE  
Applicant(s): CO-OP CHEM CO LTD  
Requested Patent: JP9175817  
Application Number: JP19950341293 19951227  
Priority Number(s):  
IPC Classification: C01B33/44; B01J13/00; C08L71/02; C09D7/12; C09D171/02  
EC Classification:  
Equivalents:

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### Abstract

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**PROBLEM TO BE SOLVED:** To obtain a composition having uniform dispersibility, high viscosity and long-term stability in an organic solvent and/or polysiloxanes by blending an organic modified clay mineral obtained by introducing a specific quaternary ammonium ion into an intercalation of a swelling layered silicate with an anionic surfactant.

**SOLUTION:** The composition contains an organic modified clay mineral obtained by introducing a quaternary ammonium ion having polyoxyethylene group and/or a quaternary ammonium ion having polyoxypropylene group into intercalation of a swelling layered silicate and an anionic surfactant. The sol-gel composition is formed by dispersing the composition into an organic solvent and/or polysiloxanes. The swelling layered silicate includes e.g. a smectite based clay mineral or a swelling mica mineral.

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## COMPOSITE OF CLAY AND POLYMER CONTAINING SPHERICAL SHELL-LIKE CARBON

Patent Number: JP9132695

Publication date: 1997-05-20

Inventor(s): ISHIKAWA SHUNEI;; NAKAYAMA ATSUYOSHI;; ISHIDA TADASHI

Applicant(s): AGENCY OF IND SCIENCE & TECHNOL

Requested Patent:  JP9132695

Application Number: JP19950314836 19951107

Priority Number(s):

IPC Classification: C08L61/06; C08K3/04; C08K3/34; C08K5/353; H01M4/60

EC Classification:

Equivalents: JP2708097B2

### Abstract

**PROBLEM TO BE SOLVED:** To obtain a new material which comprises a composite of a clay and a polymer containing spherical shell-like carbon and is used as an electrode material for lithium battery and capable of protecting the electrode from forming lithium dendrite by inserting a specified thermosetting resin between clay layers.

**SOLUTION:** This composite is obtained by inserting a thermosetting resin containing spherical shell-like carbon and a conductive phenol-formaldehyde resin between clay layers. The spherical shell-like carbon used preferably comprises C60. The clay used preferably comprises at least one of montmorillonite and saponite. An agent for enlarging the distance between clay layers may be used, which preferably comprises at least one polymer selected from N-vinyl-2-pyrrolidone and N-vinyl-2-oxalidone.

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## LIPOPHILIC INORGANIC FILLER AND COMPOSITE RESIN COMPOSITION

Patent Number: JP9087096

Publication date: 1997-03-31

Inventor(s): NAKAZAWA HIROMOTO;; YAMADA HIROHISA;; TAMURA TAKASHI;; HOSOKAWA TERUO;; INOUE HIROFUMI;; MOGI YOSHIHIRO

Applicant(s): NATL INST FOR RES IN INORG MATER;; SHOWA DENKO KK

Requested Patent:  JP9087096

Application Number: JP19950248167 19950926

Priority Number (s):

IPC Classification: C30B29/34; C01B33/44; C08J5/10; C08K3/00

EC Classification:

Equivalents:

### Abstract

PROBLEM TO BE SOLVED: To obtain a lipophilic inorg. filler well swollen with a small amt. of org. cations and improving the heat resistance and rigidity of a composite resin compsn. having a high aspect ratio.

SOLUTION: Org. cations are intercalated into a swellable silicate represented by the formula  $[Aa(Xb Yc)(Si4-d Ald)O12(OHe F2-e)]$  and having  $>=2\mu m$  average grain diameter of single crystal grains, 70-250 $\text{\AA}$  /charge density and a smectite structure to obtain the objective lipophilic inorg. filler. In the formula,  $0.2 \leq a \leq 0.7$ ,  $0 \leq b \leq 3$ ,  $0 \leq c \leq 2$ ,  $0 \leq d \leq 4$ ,  $0 \leq e \leq 2$ , A is at least one cation selected from among alkali metal ions and alkaline earth metal ions, X and Y are cations entering into each octahedron in the smectite structure, X is at least one among Mg, Fe, Mn, Ni, Zn and Li, and Y is at least one among Al, Fe, Mn and Cr.

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## COMPOSITE THERMOPLASTIC RESIN MATERIAL AND ITS PRODUCTION

Patent Number: JP9067521

Publication date: 1997-03-11

Inventor(s): AKAKABE MICHIO;; YAMAMOTO YASUNOBU

Applicant(s): AISIN SEIKI CO LTD;; AISIN SHINEI KK

Requested Patent:  JP9067521

Application Number: JP19950222052 19950830

Priority Number(s):

IPC Classification: C08L101/00; C08F2/44; C08K7/10

EC Classification:

Equivalents:

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### Abstract

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**PROBLEM TO BE SOLVED:** To produce a composite thermoplastic resin material improved in mechanical strengths, heat resistance, surface smoothness, dimensional stability, etc., by mixing a thermoplastic matrix resin with a fibrous double-chain structure clay mineral and a specified compatibilizing resin.

**SOLUTION:** One (100) pts.wt. fibrous double chain structure clay mineral having a pore diameter distribution of 10-100 $\text{\AA}$ , a surface area of 250-400 $\text{m}^2/\text{g}$ , a diameter of 0.005-0.3 $\mu\text{m}$  and a length of 0.02-50 $\mu\text{m}$  is mixed with 10-70 pts.wt. monomer for forming a compatibilizing resin and a polymerization catalyst to allow the clay mineral to adsorb the monomer and the catalyst. The obtained mixture is heated in an inert atmosphere to polymerize the monomer and to bond the monomer to the hydroxyl groups of the mineral to obtain a polymer mixture. This mixture is split under cooling to form a fibrous composite clay mineral material. One hundred (100) pts.wt. thermoplastic matrix resin is mixed with 5-70 pts.wt. fibrous composite clay mineral material, and the mixture is melt-kneaded to compatibilize the compatibilizing resin of the fibrous composite clay mineral material with the thermoplastic matrix resin.

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## RESIN COATED SUPERFINE POWDERY SILICATE, COMPOSITION CONTAINING THE SAME AND ITS PRODUCTION

Patent Number: JP8259846

Publication date: 1996-10-08

Inventor(s): MIYANAGA SEIICHI;; DOI YASUHIRO;; TSUNODA YUZO

Applicant(s): KAO CORP

Requested Patent:  JP8259846

Application Number: JP19950091406 19950324

Priority Number(s):

IPC Classification: C09C3/10; C01B33/20; C04B41/48; C08K9/04; C08L77/00; C08L101/00

EC Classification:

Equivalents:

### Abstract

**PURPOSE:** To obtain a new coated superfine powdery silicate by coating the surface of a superfine powdery laminar silicate with an amide group-containing resin, having a wide use due to exhibition of compatibility with monomers, various solvents and resins.

**CONSTITUTION:** The surface of a superfine powdery silicate (preferably montmorillonite-based clay mineral) released into a single layer and/or several layer units is coated with an amide group-containing resin (preferably nylon 6) to give the objective superfine powdery silicate coated with an amide group-containing resin. The silicate is obtained by treating the surface of the superfine powdery silicate with an ammonium salt of an &omega;-aminoalkylcarboxylic acid such as 4-amino-n-butyric acid and blending 100 pts.wt of the silicate with a monomer of a precursor for the amide group-containing resin such as &epsi;-caprolactam under conditions to give 1-300 pts.wt. of the formed amount of the coating amide group-containing resin while heating.

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## THERMOPLASTIC RESIN COMPOSITION, PRODUCTION THEREOF, AND GAS-BARRIER FILM THEREFROM

Patent Number: JP8053572

Publication date: 1996-02-27

Inventor(s): KAWAI MICHIO; others: 01

Applicant(s): MITSUBISHI CHEM CORP

Requested Patent:  JP8053572

Application Number: JP19940189384 19940811

Priority Number(s):

IPC Classification: C08K7/00; C08K3/32; C08K3/34; C08L101/00

EC Classification:

Equivalents:

### Abstract

**PURPOSE:** To obtain a thermoplastic resin composition in which a laminar silicate salt or a laminar phosphate salt is dispersed in a thermoplastic resin in a finely cleaved state, thus is useful as a film or the like because it is excellent in balance in mechanical properties, resistance to heat distortion and gas barrier properties.

**CONSTITUTION:** This composition comprises (A) a thermoplastic resin, for example, polypropylene resin or polyamide resin and (B) a laminar compound selected from a laminar silicate salt and a laminar phosphate compound having a substantially inactive compound (preferably an organic onium ion having 12 C or more alkyl group) between layers wherein the amount of component B is 0.01-40wt.% calculated as ash and more than 40wt.% of component B is dispersed in component A in 0.05-10nm thickness. This composition is obtained in a powdery composite form by loading stress and compression force of higher than 500sec<sup>-1</sup> shear rate to a powdery mixture of components A and B simultaneously at a temperature lower than the softening point of component A.

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## Patent References: Clay / Nanocomposites

**Company** Du Pont Japan, Ltd., Japan; du Pont de Nemours, E. I., and

**Title** Production of polyimide composite moldings

**Author:** Kaku, Motoo; Nakano, Mitsuru

**Publication Date** 1996

**Source:** Jpn. Kokai Tokkyo Koho, 5 pp. CODEN: JKXXAF PI JP09194724 A2  
970729 Heisei AI 96JP-0010838 960125 DT Patent  
LA Japanese

**Abstract:** The title moldings, e.g., precise bearings, sealings, etc. (no data), are manufd. by dispersing tetraalkyl ammonium salt-treated clays (e.g.,

**On hand?** trioctylmethylammonium chloride-treated \*\*\*montmorillonite\*\*\* ) in basic solvents (e.g., pyridine, .beta.-picoline), mixing with polyamic acids (e.g., biphenyltetracarboxylic dianhydride-m-phenylenediamine copolymer), adding poor solvents (e.g., acetone) to ppt. the polyamic acid composite, and heating (e.g., sintering) to give a polyimide composite.

NO

**POLYAMIDE RESIN COMPOSITION AND ITS PRODUCTION**

Patent Number: JP8012881  
Publication date: 1996-01-16  
Inventor(s): KAWAI MICHIO; others: 02  
Applicant(s): MITSUBISHI CHEM CORP  
Requested Patent:  JP8012881  
Application Number: JP19940231748 19940927  
Priority Number(s):  
IPC Classification: C08L77/00; C08K3/34  
EC Classification:  
Equivalents:

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**Abstract**

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PURPOSE: To obtain a composition, having a high strength and rigidity, excellent in ductility, good in molding appearance and excellent in gas barrier properties.

CONSTITUTION: This polyamide resin composition comprises an intercalation compound containing a phyllosilicate having  $\geq 30$  mequiv./100g cation exchange capacity as a host and a quaternary ammonium ion having a  $\geq 12$ C alkyl group as a guest in an amount of 1-20wt.% expressed in terms of inorganic ash content and a polyamide resin having 70-500 number-average polymerization degree. Furthermore, this method for producing the resin composition is provided and a polyamide-based resin composition comprises the polyamide resin and an acid-modified polyolefin resin.

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**AROMATIC POLYCARBONATE RESIN COMPOSITION**

Patent Number: JP7228762  
Publication date: 1995-08-29  
Inventor(s): YAMAGUCHI AKIRA; others: 01  
Applicant(s): CO-OP CHEM CO LTD; others: 01  
Requested Patent: JP7228762  
Application Number: JP19940022832 19940221  
Priority Number(s):  
IPC Classification: C08L69/00; C08K3/34  
EC Classification:  
Equivalents:

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**Abstract**

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**PURPOSE:** To improve the strengths, stiffness, toughness, clarity, molded surface, and melt flowability of an arom. polycarbonate resin by compounding it with an intercalation compd. comprising a specific layered silicate as the host and a specific org. onium ion as the guest.

**CONSTITUTION:** An arom. polycarbonate resin compsn. contains an intercalation compd. comprising a layered silicate having a cation exchange capacity of 30 milliequivalent/100g or higher as the host and an org. onium ion having a polyethylene glycol chain as the guest in an amt. of the compd. of 0.1-10wt.% in terms of inorg. ash. Pref. the guest is a quaternary ammonium ion having a polyethylene glycol chain.

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## Patent References: Clay / Nanocomposites

**Company** Mitsubishi Chem Corp, Japan  
**Title** An aromatic polycarbonate resin composition  
**Author:**  
**Publication Date** 1995  
**Source:** Japanese Unexamined Patent Publication No. 7-2-7134 (207134-1995)

**Abstract:** An aromatic polycarbonate resin composition which contains from 0.1 to 10wt% (based on inorganic ash content) of an intercalation compound in which the host is a layered silicate with a cation exchange capacity of at least 30 meq (milliequivalents) per 100g and the guest is an organic onium ion with an alkyl group having at least 12 carbons.

**On hand?** YES  
As well as being outstanding in terms of strength and rigidity, there is no great loss in toughness, in particular ductility, and the increase in specific gravity is low, the appearance of the moulded surface and the melt flow properties are outstanding and, moreover, there is an isotropic improvement in the dimensional accuracy.

## Patent References: Clay / Nanocomposites

**Company** Coop Chemical Co., Ltd, Japan; Mitsubishi Kagaku Kk  
**Title** Clay Organic Complex Composites and Their Uses  
**Author:** Seinosuke Ando, Yoshihiro Sekimoto, Ikio Kondo, et al  
**Publication Date** 1994  
**Source:** Japanese Patent Application No. Hei 6(1994)-172741

**Abstract:** Sol or gel clay organic complex composites in which clay organic complexes into which quaternary ammonium ions represented by the general formulas (I)  $N(R_1, R_2, R_3, R_4)$  and (II)  $N(R_5, R_6, R_7, R_8)$ , ( $R_1$  represents a hydrogen atom or alkyl groups with 1-30 carbons,  $R_2$  and  $R_3$  each represent  $-(CH_2CH_2O)_nH$  groups or alkyl groups with 1-30 carbons,  $R_4$  represents a  $-(CH_2CH_2O)_nH$  group and  $n$  is an integer greater than 2; or quaternary ammonium ions for which, in the above formula,  $R_5$  represents an alkyl group with 1-4 carbons, and  $R_6, R_7$  and  $R_8$  represent alkyl groups with 6-14 carbons) have been introduced between layers of swelled, layered silicate salts, are added to and dispersed in mixed solvents of highly polar organic solvents and water.

**On hand?** NO